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What is claimed is:

- 1 1. A coronary bypass procedure comprising:
 - 2 positioning a heat transfer element in a blood vessel of a patient;
 - 3 cooling the body of the patient to less than 35°C using said heat transfer element;
 - 4 and
 - 5 forming a fluid communicating graft between an arterial blood supply and the
 - 6 coronary artery;
 - 7 wherein the patient's blood is oxygenated with the patient's lungs and wherein
 - 8 blood is circulated using the patient's heart or using an intracorporeal pump.
- 1 2. The coronary bypass procedure of claim 1, wherein the heat transfer element absorbs
 - 2 at least 150 Watts of heat during cooling.
- 1 3. The coronary bypass procedure of claim 1, further comprising warming the body of
 - 2 the patient to about 37 °C using said heat transfer element, subsequent to the step of
 - 3 forming the fluid communicating graft.
- 1 4. The coronary bypass procedure of claim 1, wherein the step of forming a fluid
 - 2 communicating graft between the arterial blood supply and the coronary artery is
 - 3 preformed on a beating heart during bradycardia of the heart.
- 1 5. The coronary bypass procedure of claim 1, wherein the heart is arrested or nearly
 - 2 arrested during at least a portion of the step of forming the fluid communicating graft.
- 1 6. The coronary bypass procedure of claim 5, wherein the heart is chemically arrested.
- 1 7. The coronary bypass procedure of claim 5, wherein the heart is electrically arrested.

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- 1 8. The coronary bypass procedure of claim 5, wherein the patient's circulation is
2 supported with a pump positioned in the patient's vasculature.
- 1 9. The coronary bypass procedure of claim 8, wherein the pump is at least partially
2 positioned in the left ventricle.
- 1 10. The coronary bypass procedure of claim 9, wherein the pump is introduced through
2 the femoral artery.
- 1 11. The coronary bypass procedure of claim 1, wherein the heartbeat is intermittently
2 arrested and stimulated; and wherein at least a portion of the step of forming the fluid
3 communicating graft is carried out during periods of heartbeat arrest.
- 1 12. The coronary bypass procedure of claim 11, wherein the heart is chemically arrested
2 and wherein the heartbeat is electrically stimulated.
- 1 13. The coronary bypass procedure of claim 12, wherein the heart is chemically arrested
2 using one or more beta-blockers.
- 1 14. The coronary bypass procedure of claim 11, wherein the heart is electrically arrested
2 and electrically stimulated.
- 1 15. The coronary bypass procedure of claim 1, wherein the heat transfer element is
2 positioned in the venous vasculature.
- 1 16. The coronary bypass procedure of claim 15, wherein the heat transfer element is
2 positioned in the inferior vena cava.
- 1 17. The coronary bypass procedure of claim 16, wherein the heat transfer element is
2 introduced into the femoral vein.

1 18. The coronary bypass procedure of claim 17, wherein the heat transfer element is
2 about 4 to 5 mm in diameter.

1 19. The coronary bypass procedure of claim 1, wherein said heat transfer element is
2 attached to a distal end of a flexible catheter, wherein said catheter is used in the step of
3 positioning said heat transfer element in said blood vessel, and wherein said catheter is
4 used to convey chilled or heated fluid to the interior of said heat transfer element.

1 20. The coronary bypass procedure of claim 19, wherein the heat transfer element
2 further comprises a plurality of exterior surface irregularities, said surface irregularities
3 being shaped and arranged to create mixing in the blood.

1 21. The coronary bypass procedure of claim 20, wherein the heat transfer element
2 further comprises a plurality of interior surface irregularities within said heat transfer
3 element, said interior surface irregularities being shaped and arranged to create mixing in
4 fluid within said heat transfer element.

1 22. The coronary bypass procedure of claim 21, wherein said interior and exterior
2 surface irregularities comprise one or more helical ridges and one or more helical
3 grooves.

1 23. The coronary bypass procedure of claim 1, wherein the use of a cardiopulmonary
2 bypass system and obstruction of the ascending aorta are avoided.

1 24. The coronary bypass procedure of claim 1, wherein the body of the patient is cooled
2 to $32 \pm 2^\circ \text{C}$ using said heat transfer element.

1 25. The coronary bypass procedure of claim 6, wherein the heart is arrested using a beta-
2 blocker.

1 26. A hypothermic medical procedure comprising:
2 administering a beta-blocking drug to a patient;
3 delivering a heat transfer element to a blood vessel of the patient; and
4 cooling a region of the patient or the body of the patient to less than 35°C
5 using said heat transfer element while said patient is in a conscious or semiconscious
6 state.

1 27. The procedure of claim 26, wherein the beta-blocking drug is a $\beta 1$ blocker.

1 28. The procedure of claim 27, wherein the $\beta 1$ blocker is selected from one or more of
2 acebutolol, atenolol, betaxolol, bisoprolol, esmolol and metoprolol.

1 29. The procedure of claim 26, wherein the beta-blocking drug is a $\beta 1\beta 2$ blocker.

1 30. The procedure of claim 29, wherein the $\beta 1\beta 2$ blocker is selected from one or more of
2 carteolol, nadolol, penbutolol, pindolol, propranolol, sotalol and timolol.

1 31. The procedure of claim 26, wherein the beta-blocking drug is an $\alpha\beta 1\beta 2$ blocker.

1 32. The procedure of claim 29, wherein the $\alpha\beta 1\beta 2$ blocker is selected from one or more
2 of carvedilol and labetalol.

1 33. The procedure of claim 26, wherein the beta-blocking drug is administered after
2 delivering the heat transfer element.

1 34. The procedure of claim 26, wherein the body of the patient is cooled.

1 35. The procedure of claim 26, wherein an organ of the patient is cooled.